

# **Autonomous Lifeguard**

## **Student Project Funds Proposal**

### **Abstract**

In the United States, there have been a reported 99 people that have drowned in the past year alone, with a good number of them occurring while a lifeguard was on duty. In that year, there were 63,000 individual cases where Lifeguards rescued around 63,000 individuals at risk of drowning. Last year alone, around 99 people have drowned with a good number of them occurring while a lifeguard was on duty. We are proposing an autonomous surface vehicle to aid and assist drowning victims during the critical minutes before help can reach them.

This project We are building an autonomous surface vessel that will aid a lifeguard on the beach in order to save someone from drowning. Our project allows a lifeguard to quickly target a drowning person with a magnifying scope that will obtain their GPS coordinates using calibrated encoders, and then communicate them to an autonomous boat located in the water beyond the shore break. The boat will, using its own on-board GPS, navigate itself to the person and allow them to hang on and stay afloat until the lifeguard arrives. This project aims to keep beaches safer by reducing the risk of drowning. This is an example of how I am most inclined to work on projects like this one that can preserve or improve the quality of life for all people.

This project is composed of two systems, a command center and autonomous vehicle, that will wirelessly communicate with each other. The command center will consist of a GPS-based scope mounted on a lifeguard post that will allow the user to obtain a coordinate location of a drowning victim. Once prompted, the command center communicates this waypoint to the autonomous vehicle stationed in the water. The vehicle will then navigate to the designated waypoint using an onboard GPS unit. Upon reaching this destination, the ASV will intelligently traverse the area until the drowning victim has grabbed onto the vehicle. The ASV will support the victim and allow them to rest while the lifeguard makes their way to the victim.

### **Narrative**

#### **Background**

The city of Los Angeles has employed the use of a device named EMILY (Emergency Integrated Lifesaving Lanyard) on their state beaches to save drowning victims. The device is deployed from the shore and remotely controlled by a human operator. Although it offers assistance, there exists multiple drawbacks of the system as a whole. The first is that it requires an operator, meaning that a lifeguard will be occupied during a rescue. The second is that the device must fight against the wave breaks in order to reach a victim. This implies delay when navigating to the victim. The third drawback is that the device is limited by the field of view and skill of the operator.

We propose a fully autonomous system that will navigate to the location of a drowning victim, offering assistance as a lifeguard is deployed from shore. This eliminates the need for a human operator, allowing the lifeguard to swim out to the victim as the device navigates to the victim. The device will be stationed within the water at a certain distance from the shore and beyond the wave breaks so that it may arrive at a drowning victims location swiftly.

## **Objective**

## **Procedure**

In order to accomplish our objective of designing and implementing a device that can save someone from drowning, we are approaching this project in three phases: research and design, testing, and integration. Currently, we are in the research and design phase, which involves

integration is an iterative process that may lead us back into the testing phase depending on the success that

## **Qualifications**

## **Benefits**